Addendum to Study Plan P-D-I-1.8

Effects of organochlorine pollutants on black-crowned night herons in Pacific Northwest

The above study plan was designed with two objectives: (1) to determine the effects of organochlorine pollutants on black-crowned night herons nesting in the Pacific Northwest, and (2) to determine the population's wintering localities. The study was initially designed to last two nesting seasons (1979 and 1980). During these nesting seasons, some understanding of the impact of pollutants (mainly DDE) upon the productivity of the species has been gained: (1) DDE residues in eggs were higher in the southern portion of the study area and peaked at Ruby Lake NWR, (2) productivity was lowest and egg breakage highest at Ruby Lake NWR, (3) productivity is adversely affected when DDE levels in eggs reach 8-12 ppm, and is nearly eliminated at levels over 25 ppm, and (4) adult birds were dying at Ruby Lake NWR in 1980, possibly due to DDE poisoning since one dead bird in 1975 contained 230 ppm DDE in its brain.

However, no new insight has been gained about the source of the DDT at Ruby Lake NWR. Fish from Ruby Lake were collected and await analysis at PWRC; in addition, regurgitated prey of young herons from the various colonies were also collected. First priority on the old study plan is the analysis of the prey samples. It is doubtful that the DDT source at Ruby Lake is local for the following reasons: (1) the lake is at high elevation with no rivers flowing into, thus essentially eliminating regional contaminant sources, (2) the area is remote, i.e., 75 miles from the nearest town, (3) no agriculture or forestry is in the area (it is surrounded by sagebrush and cattle ranching), (4) the snowy egrets and white-faced ibis nesting in the same marsh appear to be reproducing well, and (5) the highest egg residue from Ruby Lake in 1979 contained 131 ppm DDE, 11 ppm DDD, and 18 ppm DDT. The presence of the parent material (DDT) suggests that the primary source of the DDE is a place where DDT is still used.

The clinal pattern (north-south) of eggshell thinning also tends to suggest a wintering area source of DDT, i.e., birds produced at a given latitude will tend to winter at a given latitude. Ohlendorf et al. (1978, Wading Birds) reported a significantly greater proportion of birds from the southern Atlantic coastal states (Florida-New Jersey) than from the northern states (New York-Maine) were recovered in Latin America. Assuming the distribution of band recoveries represent the wintering distribution or relative distribution of birds, it appears that a higher percentage of the more southern breeding black-crowned night herons winter further south.

A review of the presence of DDT (the parent material) in eggs from the six colonies in 1979 also shows an interesting pattern (Table 1).

Table 1. The percent of eggs collected in 1979 at various latitudes that contained the parent material DDT.

Nesting location	Latitude	Percent eggs with DDT
Moses Lake	47°	17%
Ladd Marsh, Three-mile, McNary	45-46°	29%
Malheur	43°	43%
Ruby Lake	40°	58%

It becomes obvious that if we eliminate a nesting grounds' source of DDT, a higher percentage of the Ruby Lake birds are wintering in an area where the pollutant is still used. Although several hundred night herons have been banded during this study in the last 2 years, no recoveries have resulted. Only three wintering area recoveries exist from the Pacific Northwest breeding population: (1) banded at 47° in Washington and recovered in Nayarit, Mexico, (2) banded at 43° in Idaho and recovered in Nayarit, Mexico, and (3) banded at 43° in Idaho and recovered in Colema, Mexico. All recoveries were from the west coast of Mexico with Colema being about 100-150 miles south of Nayarit. Based upon banding data available from the Pacific Northwest and the Atlantic Coast, the west coast of Mexico or Central America is the most likely wintering area for the Ruby Lake birds--probably somewhere south of Colema.

Twelve radio transmitters will be placed on adult black-crowned night herons at Ruby Lake in 1981. The birds will be searched for in the winter (December-January) via aircraft and radio-telemetry equipment. The search pattern will follow the west coast of Mexico as far south as needed. Upon location of a signal on the wintering grounds, an attempt will be made to locate the birds and to collect some prey species in the vicinity. If logistics prove too difficult at the time, an effort to collect samples from the area will be made at a later date.

A wintering grounds source of pollution outside the United States has never been documented as having an adverse effect on a U. S. breeding bird population, although pollution on wintering grounds has been speculated about for years. This study is halfway to completion, the magnitude of the problem is documented, but the contaminant source remains obscure. It is much easier to work on a problem of this sort with colonial species rather than solitary nesters. Birds of prey are probably the only other group of birds that may still be adversely affected by wintering area contaminants and they are all solitary nesters. The waterfowl and waterbirds of Nevada rank No. 53 on the FY1980 Service-wide Resource Priority Ranking, likewise the waterfowl and other waterbirds of the Harney Basin (one of the Oregon colonies) ranks No. 58.

Work Schedule:

Approximately six weeks of field work on the breeding grounds in Nevada during the spring and summers of both 1981 and 1982. Approximately

two weeks of field work in the winter of 1981-82 searching for the wintering grounds by aircraft. Additional work in future years will depend upon locating the wintering night herons.

Estimated Annuals Costs:*

Salaries:	
Research Biologist, GS-13, 8 weeks	$ 6,000
Expenses:	
**Travel (45 days)	1,500
Transmitters (12 @ $100)	1,200
***Chemical analyses (60) - analyses to be performed at PWRC; costs are covered under other study plans	
Aircraft and pilot - 40 hrs. flying time	3,000
Equipment and supplies	300
TOTAL	$12,000

* Predicted costs at operating level. They do not indicate support service costs or equipment costs and are not intended for budgetary use.
** Includes 14 days for biologist at Denver Wildlife Research Center that is familiar with radio telemetry work from aircraft.
*** Approximately 48 eggs and 12 blood samples will be analyzed for residues of organochlorine pollutants.

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